PATENT CLAIMS

1. A process for operating a wear-afflicted display (1), in particular a plasma display panel or an organic display, having defined pixels, in which each pixel is assigned a memory address in a memory element (3) in order to record the operating time of each pixel and is furthermore integrated over the operating time and operating intensity in order to determine a pixel wear value (R^{int}, G^{int}, B^{int}) and in which a pixel wear value, and/or a characteristic that is proportional to the respective pixel wear values, and afterward an individual pixel correction value (R^{kor}, G^{kor}, B^{kor}) is generated based on an evaluation of the respective pixel wear values by means of at least one logic element (2) for an equalization of the pixel wear, **wherein** it is differentiated for each pixel with regard to the basic colors red, green, and blue, and accordingly at least one separate pixel wear value (R^{int}, G^{int}, B^{int}) is determined for each of the three basic colors and/or at least one characteristic that is proportional to the respective pixel wear values is determined for each basic color, and these are then stored in the memory element (3), whereupon the memory element (3) is divided into a volatile and a non-volatile memory (5 and 6) or into a fast and a slow memory, pixel wear values (R^{int}, G^{int}, B^{int}) are measured in a first process step by integrating the individual pixel wear over the individual pixel operating time, are then written into the volatile memory (5) in a first storage step, are forwarded

from there into the non-volatile memory (6) in a second storage step, pixel correction values (R^{kor}, G^{kor}, B^{kor}) are then calculated by means of the logic element(s) (2) while taking into consideration these pixel wear values (R^{int}, G^{int}, B^{int}) in a second process step that is temporally decoupled from the first process step, and from these are again calculated corrected pixel values (R', G', B'), with which the display (1) can then ultimately be controlled.

2. The process of claim 1, wherein the non-volatile memory (6) is connected as overflow behind the volatile memory (5) or is connected partially or completely overlapping from behind the volatile memory (5).

3. The process of claim 1 or 2, wherein a continuous data transfer is carried out from the volatile memory (5) into the non-volatile memory (6) and/or vice versa.

4. The process of claim 3, wherein a preferably complete transfer of the data that are stored in the volatile memory (5) into the non-volatile memory (6) is carried out when the display (1) is turned off.

5. The process of claims 3 or 4, wherein the data that are stored in the non-volatile memory (6) are rewritten into the volatile memory (5) when the display (1) is turned on.

6. The process of one of the preceding claims, wherein the display (1) is operated first uncorrected and then, after the the data has been completely rewritten from the non-volatile memory (6) into the volatile memory (5), the display (1) is operated with the corrected pixel data (R', G', B') when the display (1) is turned on.

7. The process of one of the preceding claims, wherein one or several SDRAM component(s) are used as volatile memory (5).

8. The process of one of the preceding claims, wherein one or several flash component(s) and/or MRAM, FRAM, FeRAM, RRAM, or PCM component(s) are used as non-volatile memory (6).

9. The process of one of the preceding claims, wherein the corrected pixel data (R', G', B') comprise a large data width, [and have] consequently a better color resolution than the original forwarded pixel data (R, G, B).

10. The process of one of the preceding claims, wherein the respectively recorded volume of data is reduced, in particular by reducing the accuracy of the recorded pixel wear values (R^{int}, G^{int}, B^{int}) or the characteristics that are proportional to these, and/or by storing a difference value between the

respective pixel wear value (R^{int}, G^{int}, B^{int}) and a predeterminable maximum pixel wear value.

11. The process of one of the preceding claims, wherein the intensity of the individual pixels is increased or reduced separately and/or by sections, preferably separately, for each of the basic colors red, green, [and] blue, in dependence upon respective individually stored pixel wear values (R^{int}, G^{int}, B^{int}) and/or characteristics that are proportional to these.

12. The process of claim 11, wherein the increase and/or decrease of the intensity of the individual pixels is carried out automatically, interactively, and/or manually in dependence upon predetermined threshold values.

13. The process of claim 11 or 12, wherein a correction image for the display (1) is generated from the stored pixel wear values or from the characteristics that are proportional to these, whose indication on this display (1) equalizes the different individual pixel wear values with a general wear level.

14. The process of claim 13, wherein the indication of the correction image on the display (1) is carried out automatically, interactively, or manually at predeterminable times in dependence upon predetermined threshold values of the pixel wear

value or the characteristics that are proportional to the pixel wear values.

15. The process of claim 13 or 14, wherein selected pixels are operated separately very brightly in order to accelerate the equalization of the pixel wear values (R*, G*, B*).

16. The process of one of the preceding claims, wherein pixel correction data (R^{kor}, G^{kor}, B^{kor}) predetermined by a logic (2) are added respectively to the red, green, [and] blue pixel data (R, G, B), and the display (1) is then operated with the correspondingly corrected pixel data (R′, G′, B′).

17. The process of claim 16, wherein the pixel correction data (R^{kor}, G^{kor}, B^{kor}) are determined with the logic element(s) (2) by evaluating the recorded pixel wear data (R^{int}, G^{int}, B^{int}) and/or based on the characteristics dependent from these and/or by means of wear characteristic fields stored separately for each of the three mentioned basic colors.

18. The process of claim 17, wherein the generation of the pixel correction values (R^{kor}, G^{kor}, B^{kor}) is carried out only at defined time intervals, preferably multiple times during each hour.

19. The process of claim 17 or 18, wherein the determination of the pixel correction data (R^{kor}, G^{kor}, B^{kor}) is carried out in dependence upon additional

separately predeterminable parameters, in particular the individual phosphorous characteristic of the respective display (1), the overall brightness of the display, the overall brightness of the display (1) in the basic colors red, green, [and] blue, the operating temperature of the individual display and/or the color temperature of the display (1).

20. The process of one of the preceding claims, wherein the display (1) is a master display, the memory element (3) is upgraded in a first step with the volatile and the non-volatile memory (5 and 6), and this display (1) is then additionally operated initially uncorrected with a defined image and is evaluated in this way with regard to the individual wear characteristic of this display, and the individual pixel wear values ((R^{int}, G^{int}, B^{int}) are transmitted to the memory elements (3), the correction data (R^{kor}, G^{kor}, B^{kor}) are furthermore determined by means of the logic element(s) (2) that can likewise be upgraded if necessary, and are then operated with the corrected image values (R', G', B') in order to equalize the wear on the display at the individual pixels.

21. The process of one of the preceding claims, wherein the graphic data shown on the display (1) are scaled by means of an adaptation of the respectively represented resolution – for instance from the formats VGA, XGA, HDTV, or PAL – to the format of the

physical resolution of the display or by way of the deinterlacing.

22. The process of one of the preceding claims, wherein the adaptation of different width-to-height ratio of the video source and display, such as, for example, 4/3 and 16/9, is integrated in the logic element (2) as well as also in the process.

23. The process of one of the preceding claims, wherein the display (1) comprises a plasma generator (13), in which the corrected pixel values (R', G', B') determined by the logic element (2) are allocated to this plasma pulse generator (13) and an individual brightness control of the pixels of the display (1) is carried out preferably for each pixel by means of the plasma pulse generator (13).

24. The process of one of the preceding claims, wherein the display (1) comprises a plasma pulse generator (13), in which the pixel correction values (R^{kor}, G^{kor}, B^{kor}) determined by the logic element (2) are allocated to this plasma generator (13), while the RGB pixel data (R, G, B) are otherwise supplied unchanged to an RGB graphic data input of the display (1) and an individual brightness control of the pixels of the display (1) is carried out preferably for each pixel by means of the plasma pulse generator (13).

25. The process of one of the preceding claims, wherein the process of the invention can be operated in combination with previously known processes, such as for instance image shifting, brightness reduction of stills, the use of inverse images, and other processes, while the process of the invention is operated in each case in connection with the previously known processes in the sense of a control circuit that is connected downstream.

26. The process of one of the preceding claims, wherein the logic element(s) (2) can directly process the multiplexed data, for instance in connection with the formats LVDS or DVI.

27. The process of one of the preceding claims, wherein controls for limiting the maximum brightness of displays (1) are taken into consideration in that the process receives the information from the control mechanism of the display (1) and/or reproduces this mechanism and/or carries out the control on its own.

28. The process of one of the preceding claims, wherein the display (1) is activated less within the first operating time at least by sections with the aid of the corrected pixel values (R', G', B') and is only increasingly more frequently activated over the course of time with the aid of corrected pixel values (R', G', B').

29. The process of claim 28, wherein selected especially more highly used pixels are increasingly more frequently activated, in particular those having higher values than are possible or allowed within the first operating time.

30. The process of one of the preceding claims, wherein a process for gamma correction is applied in the logic element(s) (2) and integrated into the process.

31. A wear-afflicted display (1), in particular a plasma display, an LCD display, an LED wall, or an organic display, to which a logic element (2) and a memory element (3) are allocated, the memory element (3) comprising a volatile memory (5) and a non-volatile memory (6), and in which a pixel wear value (R^{int}, G^{int}, B^{int}) that is individual to each pixel or a characteristic that is proportional to these pixel wear values is stored preferably separately for each pixel in the memory element (3) for each basic color red, green, [and] blue of pixel data (R, G, B), and after a corresponding evaluation of the pixel wear values (R^{int}, G^{int}, B^{int}) or the corresponding characteristics with reference to the predeterminable parameters by means of at least one logic element (2) respectively, preferably for each individual pixel, modified or corrected RGB graphic data (R′, G′, B′) are applied on a RGB input (14) of the display (1).

32. The display of claim 31, wherein a plasma pulse generator (13) is allocated to the display for

controlling the brightness of the display (1), in which the pixel wear values (R^{int}, G^{int}, B^{int}) recorded in the memory element or the pixel correction values (R^{kor}, G^{kor}, B^{kor}) determined by means of the memory element or the characteristic corresponding thereto are forwarded to the plasma pulse generator (13), while at the same time the otherwise unchanged RGB graphic data (R, G, B) are applied at the RGB input (14) of the display (1).

34. The display of one of the claims 31 or 32, wherein in the case in which display technologies are used, in which individual colors have very different wear characteristics, preferably in connection with a OLED display, selected colors are applied with a relatively higher color and/or light component in comparison with the other colors.

35. A device according to one of the preceding claims, wherein the logic of a graphic controller is integrated in the logic element(s) and in this way the volatile memory (5) for the graphic controller and the logic element(s) can be jointly used.